

REMARKS

I. Status of Claims/Claim Amendments

Claims 45-92 are currently pending in this application. Claims 49, 50, 73, 79, and 84 have been amended herein. No new matter has been added.

By this Response to Office Action ("Response"), claim 49 has been amended to recite, *inter alia*, "wherein the polyethylene resin is chosen from one or more of low density polyethylene, linear low-density polyethylene, middle-density polyethylene, and high density polyethylene," and claim 50 has been amended herein to recite, *inter alia*, "wherein the polyethylene resin is chosen from one or more of low-density polyethylene and linear low density polyethylene," which amendments are fully supported by the original specification by at least page 6, line 10 through page 7, line 4. Applicant does not intend for these claim amendments to narrow the scope of the claims, and thus, the claims should be interpreted in that light.

Claim 73 has been amended herein to recite, *inter alia*, "a flash calcined kaolin clay," which is fully supported by the original specification by at least page 2, lines 15-24. In addition, claims 79 and 84 have been amended to correct minor typographical errors. Applicant does not intend for the amendments to claims 79 and 84 to narrow the scope of the claims, and thus, the claims should be interpreted in that light.

In light of at least this support in the original specification, Applicant respectfully submits that the amendments do not add any new matter and that the skilled artisan would readily understand Applicant to have been in possession of the claimed subject

matter at the time this application was filed. Therefore, Applicant respectfully requests that the Examiner enter the amendments without objection or rejection.

II. Claim Objections

The Office objects to claims 49 and 50, asking that the use of the word "and" be replaced with the word "or" in the respective claims. Office Action at 2. Applicant has amended claims 49 to recite, *inter alia*, "wherein the polyethylene resin is chosen from one or more of low density polyethylene, linear low-density polyethylene, middle-density polyethylene, and high density polyethylene," and claim 50 to recite, *inter alia*, "wherein the polyethylene resin is chosen from one or more of low-density polyethylene and linear low density polyethylene." Applicant submits that those amendments render the Office's objections moot, and thus, Applicant respectfully requests that the objections to claims 49 and 50 be withdrawn.

The Office also objects to claim 49, asking that the term "middle density" be replaced with "medium density." *See Id.* Applicant respectfully requests reconsideration and withdrawal of the objection. An applicant is entitled to be his or her own lexicographer, so long as the meaning of the language as used in the specification and claims would be clear to one of ordinary skill in the art. MPEP 2111.01(IV). Because Applicant's use of the term "middle density" is neither unclear nor indefinite, and would readily be understood by one of ordinary skill in the art, Applicant respectfully requests that the objection be withdrawn.

III. Rejection under 35 U.S.C. § 112, First Paragraph

The Office has rejected claims 73-79 under 35 U.S.C. § 112, first paragraph, for allegedly failing to comply with the enablement requirement. Office Action at 2. The Office asserts that "claim 73 is drawn to a polymer composition comprising a flash calcined clay," but that, "the disclosure appears to be enabling for manufacture of compositions comprising flash calcined kaolin clay only." *Id.* Claim 73 has been amended herein to recite, *inter alia*, "a flash calcined kaolin clay..." As such, Applicant respectfully requests that the rejection be withdrawn.

IV. Rejection under 35 U.S.C. § 103 over Robertson et al.

The Office has rejected claims 45-50, 52-59, 61-68, 73-82, and 84-91 under 35 U.S.C. § 103(a) as allegedly obvious over U.S. Patent No. 3,951,680 to Robertson et al. ("Robertson") in view of U.S. Patent No. 6,334,894 to Kostuch ("Kostuch") and U.S. Patent No. 5,277,970 to Schuhmann et al. ("Schuhmann"), and claims 69 and 70 under 35 U.S.C. § 103(a) as allegedly obvious over Robertson in view of Kostuch and Schuhmann, and further in view of Japanese Patent Application 11-5852 to Chokai et al. ("Chokai"). Office Action at pages 3-5.

The Office asserts that Robertson discloses a filled polyolefin composition comprising about 40 wt% of calcined kaolin. *Id.* The Office admits that Robertson does not disclose the use of flash calcined kaolin, but asserts that Kostuch discloses a method of preparing flash calcined kaolin in order to reduce the specific gravity of a mineral filler, and that it therefore would have been obvious to have employed the flash

calcined kaolin of Kostuch in the polyolefin composition of Robertson to increase the amount of filler used therein. *Id.* at 3-4.

The Office also admits that Robertson does not disclose the use of titanium dioxide, but asserts that Schuhmann teaches the use of titanium dioxide for imparting color to polypropylene compositions, and that it therefore would have been obvious to have employed the titanium dioxide of Schuhmann in the polyolefin composition of Robertson. *Id.* at 4.

The Office also admits that Robertson does not disclose the relative amounts of flash calcined kaolin and titanium dioxide which may be used, but asserts that the ratio of flash calcined kaolin and titanium dioxide would be a matter of routine experimentation and would have been well within the skill of one of ordinary skill in the art. *Id.*

The Office further admits that Robertson does not disclose the refractive index of the polymer resin, but asserts that, because the polymer resin is substantially the same as recited in the instant claims, a reasonable basis exists to believe that the resin of the prior art exhibits the claimed refractive index. *Id.*

The Office also admits that neither Robertson, Kostuch, nor Schuhmann teach or suggest the incorporation of an additional filler, but asserts that Chokai teaches that calcium carbonate is used as a pigment for imparting pearlescent luster to polyolefin films, and that it therefore would have been obvious to use the calcium carbonate of Chokai in the composition of Robertson as modified by Kostuch and Schuhmann. *Id.* at 5.

Applicant respectfully traverses the Office's § 103 claim rejections based on Robertson, Kostuch, Schuhmann, and, in the case of claims 69 and 70, Chokai, for at least the following reasons.

A. Standard for Obviousness under 35 U.S.C. § 103(a)

Questions regarding obviousness under 35 U.S.C. § 103(a) are resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, and (3) the level of skill in the art. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 U.S.P.Q. 459, 467 (1966); *see also KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1734, 82 U.S.P.Q. 2d 1385, 1391 (2007) ("While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.").

The Office must consider each prior art reference relied upon in a rejection "in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." *Graham*, 383 U.S. at 17, 148 U.S.P.Q. 467 (emphasis added); *See also* MPEP § 2141.02(VI). Moreover, the Court in *KSR* specifically confirmed that, "as is clear..., a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art" and that the Office must still provide some explicit rational support for why one of ordinary skill in the art would have been motivated to make the combination. *See KSR* at 1741 ("Rejections on obviousness grounds cannot be sustained by mere conclusory

statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.")

B. Neither Robertson, Kostuch, Schuhmann, nor Chokai, Taken Alone or in any Combination, Render Obvious the Use of Titanium Dioxide and Flash Calcined Clay with a Polymer Resin

As explained by the present Specification, titanium dioxide is known to be a very effective opacifying white pigment for polyolefin polymers. However, titanium dioxide is also known to be a very expensive material. Therefore, it has been desirable to be able to replace some of the titanium oxide component with a less expensive material, without detrimentally affecting the performance properties of the polymers. See Specification at page 1, lines 17-35. The present inventors have surprisingly discovered that the use of flash calcined kaolin clay permits the amount of titanium dioxide to be reduced, while retaining satisfactory product characteristics, including opacity and whiteness of the product. *Id.* at page 3, lines 9-14. Without wishing to be bound by theory, it is believed that, in contrast to alternative filler or pigment materials, the refractive index of flash calcined kaolin clay enables it to be uniquely suited to be used as an opacifier as a partial replacement for a portion of the titanium dioxide with respect to polymer systems having a refractive index greater than 1.45, while still retaining satisfactory product characteristics. *Id.* at page 3, lines 17-25.

This combination is simply not taught by the references of record. The primary reference cited by the Office, Robertson, while disclosing filled polyolefin compositions, does not teach or suggest the use of a titanium dioxide filler or the use of flash calcined kaolin clay, let alone the combination of the use of titanium dioxide and a flash calcined

kaolin clay. Moreover, Robertson fails to teach or suggest the weight ratio of the flash calcined clay to titanium dioxide or the refractive index of the polymer resin when hardened and/or cured to a plastic material.

Instead, the Office has resorted to the use of improper hindsight reasoning and Applicant's own disclosure to arrive at the subject matter of the pending claims by picking and choosing various materials from a variety of unrelated prior art references. However, as emphasized by the Court in *KSR*, "as is clear..., a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." See *KSR* at 1741.

1) Not All Calcined Kaolin's Are Interchangeable

The Office asserts that Robertson discloses that its filler may be calcined kaolin, but admits that Robertson does not teach that the kaolin may be flash calcined kaolin. Office Action at 3. However, not all calcined kaolins are the same or may be readily substituted with a reasonable expectation of success. As noted above, the refractive index of a filler/pigment material, as compared to the refractive index of the polymer material, directly affects the ability of that filler material to scatter light or act as an opacifying agent in that polymer material. See Specification at page 1, lines 17-27. While flash calcined kaolin clays have been measured to have a refractive index on the order of about 1.39 (see *id.* at page 3, lines 17-25), conventional calcined kaolin clay (i.e., soak calcined clay) is known to possess a refractive index of much higher, or about 1.56. Therefore, conventional calcined kaolin clay would not be expected to result in the same opacifying properties as flash calcined kaolin, and would therefore

not be suitable for use according to the instant invention. As such, mere disclosure of "calcined kaolin" would not have been sufficient to render obvious the claimed use of *flash* calcined kaolin clay.

2) It Would Not Have Been Obvious to Use the Flash Calcined Kaolin Clay of Kostuch in the Composition of Robertson

The Office's assertion that it would have been obvious to one of ordinary skill in the art to use the flash calcined kaolin clay of Kostuch in the composition of Robertson is purely a result of improper hindsight reasoning. The Office asserts that the skilled artisan would have been motivated to use the flash calcined kaolin of Kostuch in the composition of Robertson "so that more filler can be used, resulting in material with enhanced mechanical properties." Office Action at 4. However, Robertson expressly discloses that the addition of filler generally impairs the mechanical properties of a resin material—not enhances them—and is, in fact, primarily directed to the use of a coupling agent "to diminish the loss of mechanical properties relative to the unfilled plastics." Col. 1, lines 30-45. Therefore, Robertson actually teaches away from the addition of more filler and away from the proposed combination asserted by the Office. Such teaching away is strong evidence of non-obviousness. MPEP § 2141.02(VI) (The Office must consider each prior art reference relied upon in a rejection "in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." (citation omitted)).

The Office also asserts that "one skilled in the art would have found it obvious to use flash calcined kaolin in order to be able to vary the color to a wider extent where

more filler may be incorporated into the resin." Office Action at 4. In addition to Robertson expressly teaching away from the addition of more filler, Applicant respectfully submits that the Office's statement with regard to color may appropriately be made about almost any pigment, filler, or extender. Such reasoning is clearly insufficient under 35 U.S.C. § 103 to render obvious the addition of the particular flash calcined kaolin clay material of Kostuch into the composition of Robertson. *See KSR* at 1741 ("Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.")

3) It Would Not Have Been Obvious to Use the Titanium Dioxide Component of Schuhmann in the Polyolefin Composition of Robertson With the Flash Calcined Kaolin Clay of Kostuch

The Office admits that Robertson does not teach the use of either titanium dioxide or flash calcined kaolin clay, nor in the ratio recited in the pending claims (*see* Office Action at 3-4), but asserts that it would have been obvious for one of ordinary skill in the art to have modified the polyolefin composition of Robertson to 1) add the undisclosed flash calcined kaolin component from Kostuch, 2) add the undisclosed titanium dioxide component of Schuhmann, and 3) conduct routine experimentation to have arrived at the claimed ratio of the two components. However, such a lengthy list of untenable modifications is simply not sufficient to render the claimed subject matter obvious.

First, as explained above, there would have been no motivation or expectation of success, nor would it have been otherwise obvious, to have added the flash calcined

kaolin clay of Kostuch to the polyolefin composition of Robertson. Moreover, none of the references of record, taken either alone or in any combination, teach the use of the combination of both a flash calcined kaolin clay and titanium dioxide in a composition further comprising a polymer resin. While the Office asserts that Kostuch suggests the combination of a flash calcined kaolin clay and titanium dioxide (Office Action at 4), such a disclosure is in the context of a paint composition, not a polymer composition. See Kostuch at col. 5, lines 16-25. One of ordinary skill in the art would be well aware of the differences between a paint composition and a polymer composition and that combinations of materials useful in one composition would not necessarily be useful in another. Furthermore, while Kostuch expressly discloses this combination in relation to paint compositions, it is important to note that Kostuch does not disclose this same combination as useful for polymer compositions, thus weighing against obviousness.

4) It Would Not Have Been Obvious to Have Arrived at the Claimed Ratio of Flash Calcined Kaolin Clay to Titanium Dioxide

The Office's argument that it would have been only a matter of routine experimentation to have arrived at the claimed ratio of flash calcined kaolin clay to titanium dioxide is also legally insufficient. The Office has asserted that one of ordinary skill in the art would have been motivated to add the flash calcined kaolin clay of Kostuch into the composition of Robertson for a completely different purpose from that recited in the instant application (increased filler, enhanced mechanical properties, and variability of coloration vs. opacity and whiteness). Even if, for the sake of argument, the skilled artisan would have been motivated to make such a combination, there is no

reason to conclude that the skilled artisan attempting to improve those particular properties would have been led to the same claimed ratio that was found to be useful regarding the very different properties of opacity and whiteness. Quite simply, the Office's presumption that the skilled artisan would have been led to the claimed ratio through routine experimentation is clearly unfounded, unsupportable, and insufficient to establish a proper *prima facie* case of obviousness.

5) Chokai Fails to Remedy the Deficiencies of Robertson, Kostuch, and Schuhmann

Whatever Chokai may teach about the incorporation of an additional filler, such as calcium carbonate, it fails to remedy the deficiencies of Robertson, Kostuch, and Schuhmann. Therefore, Applicant respectfully requests reconsideration and withdrawal of the § 103(a) claim rejections based on the Office's hypothetical combination of Robertson, Kostuch, and Schuhmann, and, with respect to claims 69 and 70, the hypothetical combination of Robertson, Kostuch, Schuhmann, and Chokai.

V. Rejection under 35 U.S.C. § 103 over Suzuki et al.

The Office has rejected claims 45-58 and 62-92 under 35 U.S.C. § 103(a) as allegedly obvious over U.S. Patent No. 3,725,520 to Suzuki et al. ("Suzuki") in view of Kostuch and claims 59 and 60 under 35 U.S.C. § 103(a) as allegedly obvious over Suzuki in view of Kostuch and further in view of U.S. Patent No. 4,740,538 to Sekutowski et al. ("Sekutowski"). The Office asserts that Suzuki relates to the manufacture of porous thermoplastic films and sheets comprising a filler selected from

kaolin, titanium dioxide, and calcium carbonate. Office Action at page 6. The Office further asserts that Suzuki teaches that typical compositions contain a combination of fillers, for instance, a mineral filler to impart porosity and titanium dioxide to impart color and opacity. *Id.*

The Office also admits that Suzuki does not teach the use of a flash calcined kaolin, but asserts that Kostuch discloses methods of preparing flash calcined kaolin in order to reduce the specific gravity of the mineral filler, and that it therefore would have been obvious to use the flash calcined kaolin of Kostuch in the composition of Suzuki to increase the amount of filler used therein.

The Office also admits that Suzuki does not disclose the relative amounts of flash calcined kaolin and titanium dioxide which may be used, but asserts that the ratio of flash calcined kaolin and titanium dioxide would be a matter of routine experimentation and would have been well within the skill of one of ordinary skill in the art. *Id.*

The Office further admits that Suzuki does not disclose the refractive index of the polymer resin, but asserts that, because the polymer resin is substantially the same as recited in the instant claims, a reasonable basis exists to believe that the resin of the prior art exhibits the claimed refractive index. *Id.*

The Office admits that neither Suzuki nor Kostuch disclose the use of a silane coupling agent, but asserts that Sekutowski teaches the treatment of kaolin filler with organosilane coupling agent in order to improve dispersibility of the filler into the thermoplastic resin, and that it therefore would have been obvious to use the silane coupling agent of Sekutowski in the compositing of Suzuki and Kostuch. *Id.* at 8.

Applicant respectfully traverses the Office's claim rejections based on Suzuki, Kostuch, and, with respect to claims 59 and 60, Suzuki, Kostuch, and Sekutowski, for at least the following reasons.

A. Neither Suzuki, Kostuch, nor Sekutowski, Taken Alone or in any Combination, Render Obvious the Use of Titanium Dioxide and Flash Calcined Clay with a Polymer Resin

Suzuki is primarily directed to a method for preparing a porous film or sheet comprising at least one thermoplastic resin, a solvent, and a filler. Abstract. While Suzuki may disclose that the filler may comprise kaolin, it does not teach or suggest that the kaolin may be calcined kaolin, let alone *flash* calcined kaolin, nor the combination of the use of titanium dioxide and a flash calcined kaolin clay. Moreover, Suzuki fails to teach or suggest the recited weight ratio of the flash calcined clay to titanium dioxide or the recited refractive index of the polymer resin when hardened and/or cured to a plastic material.

1) It Would Not Have Been Obvious to Use the Flash Calcined Kaolin Clay of Kostuch in the Composition of Suzuki

As explained above, not all fillers are the same, nor are they necessarily interchangeable in a polymer composition. Suzuki discloses a laundry list of fillers for use in its invention including:

calcium carbonate, magnesium carbonate, barium sulfate, powdered silica, mica, kaolin, clay, diatomaceous earth, talc, gypsum, asbestos, rock wool, alumina, aluminum hydroxide, titanium oxide, powdered glass, short glass fibers, white carbon, pulp floc, short synthetic polymers fibers, short natural polymer

fibers, natural polymer particles and a mixture of at least two of these members.

Col. 5, lines 16-26. While kaolin is among those listed, calcined kaolin is not listed, let alone flash calcined kaolin. One of ordinary skill in the art would simply not have been motivated to have chosen flash calcined kaolin from the bare description of a kaolin filler, from among the laundry list of fillers within the teaching of Suzuki.

Nevertheless, the Office asserts that “the skilled artisan would be motivated to use flash calcined kaolin so that a greater volume percentage of filler can be used, resulting in material with desired barrier properties with no loss of mechanical properties.” Office Action at 6. However, Suzuki expressly teaches against such an increase in the amount of filler beyond those amounts described in its specification. In particular, Suzuki states:

As is readily comprehensible, the strength of the sheet or film obtained at the same stretching ratio tends to be lowered with increase in the amount of the filler. As the desired porous sheet or film of the present invention is destined not only to the field of paper, but also to the fields of the non-woven fabric and the artificial leather, it is important to keep the strength higher.

Col. 6, lines 8-14.

Such an express teaching away weighs heavily against the Office's proposed combination and, in combination with the fact that Suzuki does not even recite calcined kaolin clays, demonstrates that the Office's proposed combination is insufficient to establish a proper case of *prima facie* obviousness.

2) It Would Not Have Been Obvious to Use the Flash Calcined Kaolin Clay of Kostuch in the Composition of Suzuki in the Claimed Ratio

The Office admits that Suzuki “does not impose limitation on the relative amounts of kaolin and titanium dioxide which may be used,” but asserts that “the working examples show use of about 10/1 to 6/1 ratio of filler to titanium dioxide.”¹ Office Action at 6. However, the filler used in those examples is entirely different from that claimed (calcium carbonate vs. flash calcined kaolin), and is not necessarily being used for the same purpose. Therefore, the skilled artisan would not necessarily assume that the same ratio of mineral filler to titanium dioxide would be desired.

In addition, when discussing the same properties as those recited in the pending application—whiteness and opacity—Suzuki expressly teaches a much higher ratio than claimed. Suzuki at Col. 7, lines 53-57 (“For example, a white sheet having a higher opacity and an appearance and properties similar to those of the printing paper can be obtained by adding 40 parts by volume of CaCO₂ and 2 parts by volume of TiO₂ to 100 parts by volume of the resin.”) That ratio is 20/1 and is clearly outside of the claimed range of “less than or equal to about 10:1.” Therefore, if Suzuki teaches anything about the ratios, it actually teaches away from the ratios recited in the pending claims, not toward them.

¹ Applicant notes that the examples cited by the Office appear to range from 1/20 to 1/6, not 1/10 to 1/6. See col. 7, lines 53-57 (“40 parts by volume of CaCO₃ and 2 parts by volume of TiO₂”).

3) Sekutowski Fails to Remedy the Deficiencies of Suzuki and Kostuch

Whatever Sekutowski may teach about the use of silane coupling agents, it fails to remedy the deficiencies of Suzuki and Kostuch. Therefore, Applicant respectfully requests that the rejections over Suzuki in view of Kostuch and, with respect to claims 59 and 60, Suzuki in view of Kostuch and further in view of Sekutowski, be withdrawn and the rejected claims passed to allowance.

VI. Summary

Quite simply, it would not have been *prima facie* obvious based on either the references themselves or the knowledge of one of ordinary skill in the art, to have arrived at a composition comprising at least a flash calcined kaolin clay, titanium dioxide, and a polymer resin, let alone in the claimed ratio. In fact, as explained above, the primary references of record cited by the Office, Robertson and Suzuki, actually teach away from the combinations proposed by the Office. Therefore, a proper case of *prima facie* obviousness has not been established and Applicant requests that the rejections be withdrawn.

For at least the above-outlined reasons, Applicant's claims 45-92 should be allowable. Accordingly, Applicant respectfully requests reconsideration of this application, withdrawal of the claim objections and claim rejections, and allowance of the pending claims.

Applicant respectfully submits that the Office Action contains a number of assertions concerning the related art and the claims. Regardless of whether those

assertions are addressed specifically herein, Applicant respectfully declines to automatically subscribe to them.

If the Office has any questions regarding this Response or the application in general, Applicant cordially invites the Office to contact the undersigned attorney at (404) 653-6559. Please grant any extensions of time required to enter this Response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

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